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  	<h1>Monthly News Letter</h1> <h2>Bureau of Agricultural Engineering</h2> <p>U. S. DEPARTMENT OF AGRICULTURE</p> <p>For Bureau staff only. Not for publication.</p>	
       		

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At the recent annual meeting of the American Society of Agricultural Engineers bureau people presented papers as follows:

- S. H. McCrory (1938 John Deere Medalist) -- Water and the Land.
- A. D. Edgar -- The Control of Moisture and Temperature in Potato Storages.
- W. R. Swanson (with H.J. Barre, Iowa State College) -- The Effect of Vapor Pressure Differences on Rates of Drying of Corn.
- Fred C. Scobey -- Problems of Flow of Water of Special Concern to Agricultural Engineers.
- Harry F. Blaney -- Field Methods of Determining the Consumptive Use of Water.
- C. A. Bennett -- Relation of Mechanical Harvesting to the Production of High Grade Cotton.
- A. T. Mitchelson and D. C. Muckel -- Water Spreading for Conservation of Excess Runoff--A California Practice.
- R. M. Merrill -- The Use of Vapor Spray in Plant Disease Control.
- A. A. Young -- Use of Water by Native Vegetation.
- S. W. McBirney took part in a symposium on Special Farm Machinery Developments and applications on the Pacific Coast.
- M. R. Lewis presided over one of the sessions of the Soil and Water Conservation Division.

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John W. Randolph reported at Washington, D.C., July 8 to take up his new duties in connection with the project on Utilization and Cost of Farm Power and Machinery. Enroute he inspected the cotton planting tests conducted in cooperation with the Farm Security Administration in North Alabama. Favorable contrasting results in cotton stands were found for the Bureau's variable-depth system of planting.

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A study of the physical reactions of soil to moldboard surfaces made by I. F. Reed shows that the theory of reaction previously advanced does not hold for broad-base plows or for extremely mellow soil conditions as the primary shear planes do not extend entirely across the furrow slice. The section next to the shin acts as a chisel and the reaction described takes place only in the remainder of the slice.

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E. D. Gordon has found certain variable force relationships in studies of a disk blade held in a fixed position in the different soils at the Farm Tillage Machinery Laboratory. On the soils with a low colloid content and other soils with low moisture conditions and in an uncemented state, the



factor of draft increases with speed. The data form a uniform curve. In heavy clay soils in a moist condition there is a fluctuating relationship between draft and speed. At the low speeds the draft increases very rapidly because of the sticking of the soil to the disk causing the sliding of soil on soil. At intermediate speeds the adhesive power of the soil is broken down and there is a marked lowering of the draft due to the sliding of the soil over the disk surface. At the higher range of speeds the draft mounts as the forces set up tend to overcome the cohesive strength of the soil and throw it excessively from the disk. The minimum speed causing a uniform smooth flow of the soil over the disk without the need of the scraper gives the lowest draft figure. Furthermore the reactions of the soil on the disk are notably affected by the horizontal and vertical angles of disk setting, by the amount of bearing and by the concavity and diameter of the disk.

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Planting operations for two fertilizer-placement experiments with celery on muck at Ontario, New York, were completed June 29 by L.G. Schoenleber and D.B. Eldredge. A self-propelled, self-guiding, two-row transplanter was equipped in the Bureau with special fertilizer equipment for this work. Celery is one of the crops most heavily fertilized. In 1937 the yield from 1,000 pounds of fertilizer per acre placed in a band at each side of the row equalled the yield from 2,000 pounds of fertilizer applied broadcast which is the common farm practice.

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G. A. Cumings inspected fertilizer placement experiments in Maryland, Delaware and Virginia and conferred with officials of the Virginia Truck Experiment Station July 7 and 8. The experiments with tomatoes include treatments in which a small amount of nutrient solution is applied around the seedling roots with the transplanter water, in addition to the usual fertilizer application. The effects of the nutrient solution to date have been a more rapid recovery of the transplanted seedlings and a more rapid early growth of the plants.

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Frank Irons returned to Toledo June 26 from a several weeks' trip through the heavily infested grasshopper region of the West where he studied the various types of control equipment and methods. He reports much activity along the 'hopper' front and adds that a number of unique homemade devices for spreading poison bait were in use.

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R. M. Merrill returned to Toledo July 5 from the meeting at Asilomar where he presented a paper entitled "Use of Vapor Spray in Plant Disease Control". While in the West he contacted entomologists and others interested in pest control and pest control equipment. Mr. Merrill left Toledo late this month for Auburn, Ala., to take up his new duties as leader of the cotton production machinery project which includes the farm tillage machinery activities.

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The latter part of June Messrs. Mervine and McBirney conferred with Mr. McCrory and members of the California Experiment Station relative to future plans on the sugar beet production machinery project.

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The annual inspection of the many cement and concrete specimens immersed in Medicine Lake, S.D., was held on July 14. Medicine Lake is an ideal laboratory for testing the resistant qualities of cement for its waters contain about 14 percent of sulphates and are so corrosive that non-resistant



concretes are completely disintegrated within a few months after submergence. D.G. Miller, in charge of the work, reports tests of 158 brands of portland cements from 103 mills of the U.S., Canada and Europe. The results of this work are developing methods of making concrete drain tile that are highly resistant to soil alkali and acid conditions. The investigations are attracting nation-wide interest from cement manufacturers and other interested parties.

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Lewis A. Jones, chief of the drainage division, attended the inspection of cement and concrete specimens at Medicine Lake and conferred with Mr. Miller at St. Paul on July 20 and 21. He visited John G. Sutton at Milwaukee July 22 to discuss CCC programs and fiscal matters pertaining to the 29 drainage camps located in the Central District.

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B. S. Clayton, Belle Glade, Florida made a trip to Ocala, Fla., during the first week in July to examine a proposed drainage project to reclaim about 8,000 acres of peat lands below Moss Bluff. It will be necessary to dike and pump the land whenever reclamation is undertaken.

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An electric power line and electric drainage pumping unit are being installed by E.G. Brown of the Houma station at the sugar-cane drainage experimental project on the Crescent Farm Plantation. The installation will provide automatic control for pumping drainage water from the variable depth, open ditch and tile drained project areas. The drainage experiments are to determine the effect of various drainage methods upon production of sugar-cane.

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Jesse R. Coward, Assistant Engineering Aide, left Washington July 18 for Oxford, N.C., to make a topographic survey of a tract of land on which the Bureau of Entomology and Plant Quarantine proposes to put up a laboratory building immediately and other structures subsequently.

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The data from the strawberry irrigation experiment at Willard, N.C., compiled by F.E. Staebner, in charge of supplemental irrigation projects, show that irrigation during dry spells on top of a growing season rainfall of over 30 inches in each of the last three years has averaged to increase the yield of fruit picked from plots that were irrigated to the extent of 6 inches or more during the season by about 1,000 quarts per acre. Some scattered increases of greater quantities of fruit were obtained by the addition of more water.

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Analysis of the rainfall run-off data collected in the Ralston Creek drainage basin, Iowa, is being attempted in a detail not previously accomplished, so far as is known, for any drainage area. R.D. Marsden has just returned from a 10-weeks' study at Iowa City, in cooperation with the Iowa Institute of Hydraulic Research, of the data, the district, and methods of approach. In this drainage basin, comprising 3 square miles of rolling topography, half in cultivated crops, precipitation records have been obtained with standard and recording rain gages and run-off records with a waterstage recorder, continuously since 1924. Groundwater fluctuations also have been observed. The study is designed to discover how the run-off, which is residual rather than a proportion of precipitation, is affected in time and amount by evaporation, transpiration, and soil condition as well as by rainfall amount and distribution. Determination of the "opportunity" for evaporation and for transpiration, which is dependent upon the amount and distribution of soil moisture, is a major problem of the analysis. Air temperatures, crop growth, and such soil characteristics as permeability and capillarity are important influences to be considered.



Central District Drainage Camps during the last fiscal year ending June 30, completed 62,425,000 square yards of clearing, 16,621,000 cubic yards of excavation and embankment, 337,000 lineal feet of tile reconditioning, structural and other work, with an estimated commercial value of \$4,980,000. In doing this work 899,589 man-days were used and \$995,000 furnished by the drainage enterprises cooperating. During the period July through December, 1937, seven camps were discontinued, leaving in operation at the present date 7 in Ohio, 6 in Indiana, 5 in Illinois, 5 in Iowa, 4 in Missouri and 2 in Kentucky.

During June an inspection of southeast Missouri Camps was made by John G. Sutton, District Engineer, in company with State Inspector Clark E. Jacoby.

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M. G. Cropsey has been transferred from the Washington Office to Fargo, N.Dak., to take charge of the wheat storage studies at that point.

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J. R. McCalmont has just returned from Beemerville, N.J., where co-operative silo pressure studies are being conducted with the New Jersey Experiment Station. A 12- by 43-foot silo was filled with alfalfa and molasses silage. The pressures are being taken on this silo to compare with other silos filled with the same type of silage and corn silage. Tests recently made in an 18- by 42-foot silo show that pressures of hay and molasses silage were approximately twice as great as that with corn silage.

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The early part of July J.E. Miller, Chief of the Division of Plans and Service, made an inspection trip to Coshocton, Ohio, for the Soil Conservation Service where a contract was recently let for the construction of five new buildings.

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Following the meeting of the American Society of Agricultural Engineers at Asilomar, Pacific Grove, Calif., which closed June 30, O. W. Meier, Utilization Division, Rural Electrification Administration, and S.P. Lyle visited the State Extension Offices at Berkeley, California; Corvallis, Oregon, Pullman, Washington; Moscow, Idaho; Bozeman, Montana, and a few R.E.A. projects in these States, to further the cooperation between the Extension Service and the Rural Electrification Administration in aiding farmers to make the best usage of electricity. In addition to the States visited jointly, Mr. Meier visited the Extension Offices at Laramie, Wyoming, and Fort Collins, Colorado, and Mr. Lyle visited the Extension Offices at Fargo, North Dakota, before returning to Washington on July 17.

Other extension engineering work was discussed in these contacts, especially the need for effective extension education on irrigation practices.

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Fred C. Scobey began the collection of data for a publication on the Life of Materials of Construction Used on Irrigation Systems. On nearly all of the smaller irrigation enterprises, more or less replacement will be necessary in the next few years. It is the purpose of this study to develop: (1) factors affecting the life of structures under various conditions; (2) the life expectancy that can be anticipated if the structure is operated under specified conditions; (3) causes of failures of structures other than a normal life span, with suggested remedies for such failures; (4) the alternatives, in the way of choice of materials, open to the enterprises in the improvement or replacement of structures. (For example, inverted siphon pipes are the most costly units on many systems in the Northwest. The untreated fir used in the original construction may be repeated, or several other possibilities are available -



redwood, creosote-treated fir, concrete or steel. Each of these has its good and bad points under any given conditions of operation). Until recent years there was not enough data obtainable for many materials in common use to provide a basis for determination of life expectance, but the time has now come when records covering a sufficient period of years are available for such determination.

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M. R. Lewis spent the first part of the month in the Northern Great Plains area. In North Dakota tentative plans were completed for a cooperative study of the duty of water under irrigation, the North Dakota Agricultural Experiment Station to furnish a full-time irrigation engineer (subject to the appropriation of the necessary funds by the State Legislature); the Division of Irrigation to furnish technical supervision approximately on the basis of one-half time of an engineer; the Division of Dry Land Agriculture, Bureau of Plant Industry, to furnish office and laboratory facilities; the North Dakota State Water Conservation Commission to furnish the necessary pumping and irrigation equipment; and the Training School to furnish land, labor, and farm equipment.

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Mr. Lewis, accompanied by Carl Rohwer, visited several projects of the North Dakota Water Commission in the southwestern part of the State. In the James River Valley in the south central part of the State, an area of shallow ground water was inspected. Discussion with local farmers and a well driller, and inspection of a Forest Service nursery well and pumping outfit led to the belief that an opportunity exists for considerable supplementary irrigation from wells in an area of 50 to 100 square miles, extending into South Dakota.

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In South Dakota Messrs. Lewis and Rohwer visited several small irrigation projects, some installed under the Resettlement Administration program of last year; but on account of spring rains, none of the plants had been operated this season.

In Montana, possible irrigation pumping sites along the Missouri were visited. The small valley of Clear Creek in Dawson County presents apparently ideal possibilities for a community project of flood irrigation. This opportunity was called to the attention of the Soil Conservation Service.

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Carl Rohwer inspected the progress of well-drilling work on the irrigation projects in the Mobridge and Timber Lake areas of South Dakota, installed measuring devices and tested pumps. He also spent three days in Perkins County, laying out ditches on proposed pumping and flooding projects. He was assigned to the work of laying out a dam on the Southern Great Plains Experiment Station of the Bureau of Plant Industry, at Woodward, Okla., and left South Dakota June 27 to take up this work.

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Harry F. Blaney, assisted by A.A. Young and Dean C. Muckel, spent a large part of the month on matters pertaining to the Flood Control Survey, especially in connection with preliminary examination reports on the Kern River, Kaweah-Tule Group and the Pajaro River, and detailed surveys of the Los Angeles, San Gabriel and Santa Ana watersheds of California. For the San Gabriel River detailed survey, arrangements were made to obtain ground-water records from the Los Angeles County Flood Control District, Pasadena



Water Department, and the San Gabriel Valley Protective Association. Well records for a period of years, and other pertinent data were assembled. Prints were obtained of maps showing ground-water contours throughout the San Gabriel Basin.

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A. A. Young initiated evaporation tests of salt solutions at the Fullerton, Calif., station, the solutions ranging from 5 to 25 percent. Comparisons are made with evaporation from fresh water. Evaporation is less with the higher concentrations although the water temperatures are higher.